中国黑蚜蝇属一新种记述及其生活史研究

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摘要 记述采自中国河北省黑蚜蝇属一新种:河北黑蚜蝇 *Cheilosia hebeiensis* sp. nov.。新种隶属于 *promixa* 种团,据 Vujić et al (2013)检索表,新种近似 *C. rufimana* Becker,1894,但新种小盾片后缘主要为浅色鬃状长毛,且雄性上叶形态不同。新种模式标本保存于陕西理工大学和河北省木兰围场国有林场林草有害生物防治检疫站。给出新种详细的形态描述与主要特征图,同时记述了该种的生活史。

关键词 蚜蝇科;黑蚜蝇属;河北黑蚜蝇;新种;形态;特征;生活史

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Description of a New Species of *Cheilosia* from China and Its Life Cycle

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Abstract The paper described a new species, *Cheilosia hebeiensis* sp. nov., from Hebei Province, China. The new species belonged to the *promixa* group. Based on the key of Vujić et al (2013), the new species was similar to *Cheilosia rufimana* Becker, 1894 in appearance, but differs from the latter by whitish long bristle-like hairs on posterior margin of scutellum and the forms of superior lobe of male. The type specimens were deposited in Shaanxi University of Technology and Forestry and Grassland Pest Control and Quarantine Station, Hebei Mulan Paddock State Forest. The study detailed description and figures of the new species were offered and the life cycle of the species were also reported.

Key words Syrphidae; *Cheilosia*; *Cheilosia hebeiensis* sp. nov.; New species; Morphology; Characteristics; Life cycle

蚜蝇科(Syrphidae)黑蚜蝇属(*Cheilosia*)主要分布在古北区、新北区和东洋区,新热带区和澳洲区亦有分布,全世界已知约 480 种,其中古北区种类约占 70%[1-15]。从 1927 年 Sack 教授记述中国黑蚜蝇属种类开始,许多学者对中国黑蚜蝇属种类进行了研究,使中国黑蚜蝇属种类增至约 105 种[16-36]。

河北省木兰林场位于河北省围场满族蒙古族自治县境内,地处浑善达克沙地南缘、滦河上游地区,属阴山、大兴安岭、燕山余脉的汇接地带,区域地理坐标为 41°35′~42°40′N、116°32′~117°14′E,海拔 750~1 998 m。该地区属半干旱向半湿润过渡区、寒温带向中温带过渡区,气候为大陆性季风型山地气候,年平均气温-1.4~4.7 ℃,极端最高气温 38.9 ℃,极端最低气温-42.9 ℃,年均降水量 380~560 mm,主要集中在 7—9 月。2018—2019 年对林场区域的森林昆虫进行系统调查,在华北落叶松林内发现幼虫期生活于华北落叶松树胶中的一种黑蚜蝇,通过幼虫形态及生活史、蛹和成虫的观察与研究,确定为一新种。新种模式标本保存于陕西理工大学和河北省木兰围场国有林场林草有害生物防治检疫站。笔者对新种及其相关生物学特性进行了分析。

1 河北黑蚜蝇 *Cheilosia hebeiensis* sp. nov. (图 1)

雄性:复眼密被淡黄毛。头顶隆起,被暗褐色长毛和白色粉被,单眼三角呈等边三角形。额略鼓起,额角较大;额黑色,覆白色粉被,被白色长毛和少量黑毛。新月片黑色,触角窝分开。颜宽,黑色,具白色绵毛,中突小,侧面观超过额突,略超过口前缘;眼缘中等宽,最宽处不大于触角第 3 节高的一半,黑色,有时在复眼下方呈暗褐色,密被白毛和粉被。颊高,黑色,被白色长毛和粉被。触角基部 2 节黑褐色,第 3 节近圆形,黄褐色,背缘色暗。触角芒黑褐色,被毛极短。

胸部黑色,覆白色粉被,被长度近一致的白色长毛,胸部背板侧缘无鬃,小盾片后缘具白色鬃状长毛,盾下缘缨白色,长而密;侧板粉被和毛同背板。后胸腹板被白色长毛。

足黑色,各足腿节端部及胫节基部暗褐色,覆白色粉被,被白色短毛,前、中足腿节腹面及后侧具白色长毛,后足腿节前侧具较稀疏的白色长毛,为短毛的 3~4 倍,胫节前侧具暗褐色鬃状长毛,长度不大于胫节的直径。翅前部略染黄色,具微刺;翅脉 M_1 与 R_{4+5} 相交呈锐角;平衡棒黄色,基部及头部黄褐色。腹部近长椭圆形,黑色,被长度一致的白色长毛。

雄性尾器:黑褐色。第九背板侧面观高大于长。尾须近四边形,浅黄色,被淡黄色长毛的暗褐色鬃状长毛。背针突三角状,顶端宽而钝圆,背缘中部形成明显的隆脊,具暗褐色长鬃,端部内表面具暗褐色短鬃。第九腹板筒状,腹面后部中部具透明区。上叶狭长,基部近长方形,端部向腹面中央扭曲,呈前后扁平状,顶端圆形。阳茎端面背面观呈叉状,两叉之间具膜质的射精突。

雌性:被毛明显短于雄性。复眼被短毛。头顶及额较宽,头顶在复眼后缘处宽约为头宽 1/3,具细刻点,具 3 条纵沟,前部具横沟;头顶及额黑色,额中部两侧沿眼缘具黄色狭长斑,覆近白色粉被,主要被黑短毛。触角黄褐色,第 3 节橙黄色,大而圆。胸部背面主要被黑色短毛,背板前部白色粉被形成明显的中条纹和亚中条纹。小盾片后缘具白色长鬃,有时黑鬃。足似雄性,但被毛短,后足腿节无长毛。腹部黑

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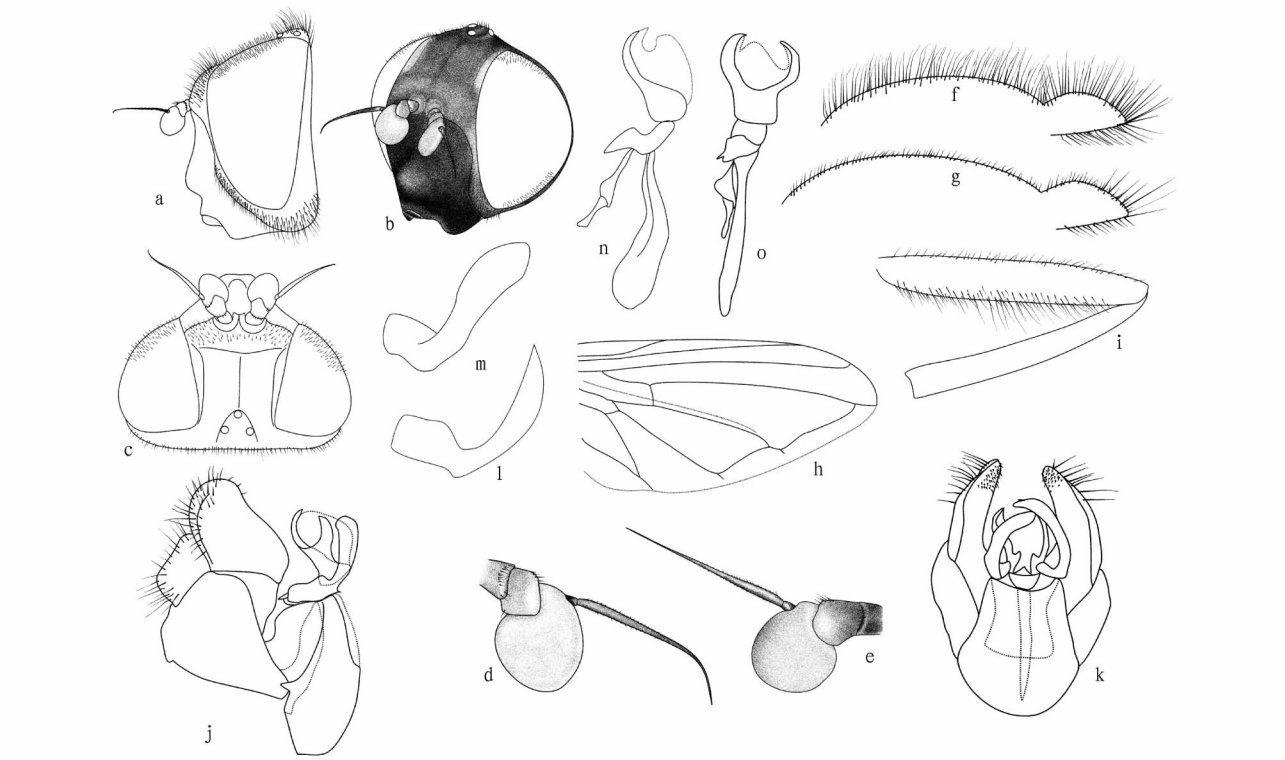

注:a. 雄性头部侧面;b. 雌性头部前侧面;c. 雌性头部背面;d. 雌性触角(内侧);e. 雄性触角(内侧);f. 雄性中胸背板及小盾片侧面;g. 雌性中胸背板及小盾片侧面;h. 翅端半部(雌性);i. 雄性后足腿节与胫节(前面);j. 雄性尾器侧面;k. 雄性尾器腹面;l. 上叶侧面;m. 上叶后侧面;n. 阳茎侧面;o. 阳茎背面

Note:a. Head, lateral view, male; b. Head, anteriolateral view, female; c. Head, dorsal view, female; d. Antenna, inside, female; e. Antenna, inside, male; f. Mesonotum and scutellum, lateral, male; g. Mesonotum and scutellum, lateral, female; h. Half top of wing, female; i. Hind femur and tibiae, anterior view, male; j. Terminalia, lateral, male; k. Terminalia, ventral view, male; l. Superior lobe, lateral view; m. Superior lobe, postrolateral view; n. Aedeagus, lateral view; o. Aedeagus, dorsal view

图 1 河北黑蚜蝇

Fig. 1 *Cheilosia hebeiensis* sp. nov.

亮,基部覆白色粉被。腹部背面具细刻点,被黑色短毛,基部及侧缘具白毛。

体长:♂9 mm,♀ 9 mm;翅长:♂7 mm,♀ 7 mm。

本种应属于 *promixa* 种团,据 Vujić et al (2013)检索表,新种近似 *C. rufimana* Becker,1894,但新种小盾片后缘主要为浅色鬃,且二者雄性上叶形态不同[37]。

正模:♂,2019-Ⅴ-6,河北木兰林场种苗场(41°43′2.6″N、118°02′1.4″E,海拔 1 078 m),蔡胜国采;副模:1♂10♀,同正模。

2 生活史研究

河北黑蚜蝇 1 年 1 代,以蛹和幼虫 2 种虫态越冬,其中蛹在树皮外的松脂内越冬,幼虫在树皮内韧皮部与木质部交界处松脂内越冬。越冬蛹翌年 5 月羽化为成虫,随后产卵,经过短暂几天卵孵化为幼虫,7 月转移至流脂孔下方附近松脂块内化蛹。越冬幼虫翌年 6 月化蛹,6—7 月羽化、产卵,幼虫孵化后取食至 9 月,随即进入越冬状态。

2.1 卵 成虫羽化后 3~5 d 产卵,多粒,产卵位置多在树干受伤流脂孔边缘。卵为粒状,0.8~1.0 mm,初产淡黄色。卵期 6~10 d。

2.2 幼虫 幼虫取食期 5—8 月,9 月—翌年 4 月为越冬态。初孵幼虫乳白色,大小 1 mm 左右,老熟幼虫体长 12~14 mm。幼虫为无头无足鼠尾蛆型,具有刮吸式口器,口钩黑色、弯曲,尾端具有一对短的呼吸管。体圆筒形,端部略逐渐变小,末端圆,原足不发达,无趾钩,后气门着生在短管上(图 2)。

幼虫孵化后通过蠕动直接侵入树皮下,生活于木质部和韧皮部之间,以树脂为食。随着幼虫危害加剧落叶松树干分泌大量松脂,过量松脂流出树体外(图 3~6)。

2.3 蛹 7 月中旬始见老熟幼虫从其危害的树皮下随流出的松脂转移到树皮外,在流脂孔下方附近松脂块中准备化蛹,流出后经 15 d 左右老熟幼虫化蛹,8 月上旬(立秋季节前后,波斯菊盛花)为化蛹始盛期,9 月上旬为化蛹盛期(落叶松开始落叶),蛹在流孔下方的树皮外松脂内(此时松脂流动性变差开始变硬)越冬。围蛹长 8~10 mm,粗 2.5~3.0 mm,棕褐色(图 7~10)。

2.4 成虫期 翌年 5 月上旬(落叶松雄花成形,针叶展叶期)随着气温快速升高,树液流动,蛹开始羽化为成虫,5 月中旬—6 月上旬为羽化盛期,羽化期持续至 6 月中、下旬。成虫寿命 7~10 d,自然状态下林间成虫量少,不易发现。成虫很少在林冠层活动,多在树冠以下位置。室内观察,成虫羽化时间多集中在 11:00—13:00,成虫在 10:00—16:00 较活

图 2　河北黑蚜蝇 3 龄幼虫背面整体

Fig. 2　The whole back of the third instar larva of *Cheilosia hebeiensis* sp. nov. , dorsal view

图 3　树干松脂内低龄幼虫

Fig. 3　The first instar larva in turpentine

图 4　树干松脂内幼虫

Fig. 4　Larva in turpentine

跃,喜欢在阳光下飞翔。

3　讨论

黑蚜蝇属广布于世界各动物地理区域,为古北区蚜蝇科中最大的属,虽然大多数种类都很常见,但对他们的生物学习性了解甚少。Dufour[38] 首次报道黑蚜蝇的生物学习性。

图 5　树干松脂内老龄幼虫

Fig. 5　Old larvae in turpentine

图 6　树干外被流脂包裹幼虫

Fig. 6　Larva embedded in flowing turpentine outside the trunk

图 7　越冬前蛹

Fig. 7　Pupa before the winter

黑蚜蝇属种类通常产卵于植物茎、叶等表面,具体的产卵位置因种而异,或产于叶背面基部,或只在离地面不远的叶片上,或产于茎干上;选择的寄主植物 1 种或几种不等;产卵方式以单粒散产为主,或数个卵堆在一块。幼虫为害植物幼茎顶端、花等器官[39-43]。黑蚜蝇 3 龄幼虫形态与取食方式有关,可分为菌食性、叶食性、茎根钻蛀性和树汁及形成层取食者。现已知黑蚜蝇属部分种类的幼虫为植食性,幼虫在高

图 8 越冬后蛹

Fig. 8 Pupa after the winter

图 9 初化蛹

Fig. 9 Pupa after putation

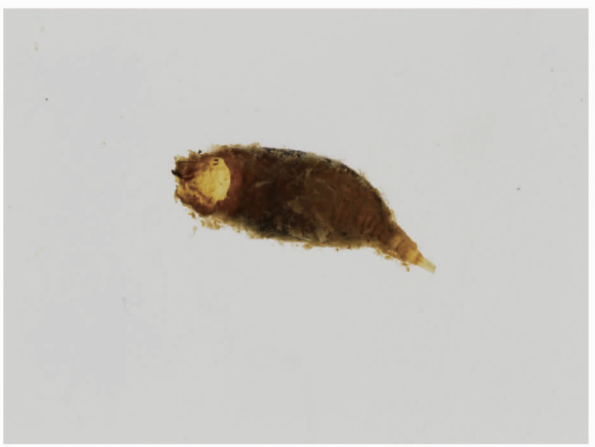

图 10 羽化后的蛹壳

Fig. 10 Pupal shell after emergence

等植物的茎干及根中钻蛀生活,或在叶中钻蛀生活,部分种类的幼虫为腐食性或菌食性,以真菌的子实体为食,还有一些种类生活于针叶树的形成层,取食树液(树脂)[40,44-45]。

关于黑蚜蝇生活在针叶树树脂中的报道并不多。*Cheilosia alaskensis* 在异叶铁杉(*Tsuga heterophylla*)形成层取食树汁,幼虫生活于松香中,而 *Cheilosia hoodiana* 幼虫生活于白冷杉(*Abies concolor*)[46]。*Cheilosia morio* 成虫生活于云杉林,幼虫在云杉树皮的树脂瘤上生活,引起云杉形成脂瘤[47-49]。河北黑蚜蝇生活于华北落叶松(*Larix principis-rupprechtii*)林中,成虫产卵于华北落叶松树干受伤流脂孔边缘,且幼虫以松脂为食,明显不同于已记录的其他种类。

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